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Report of the technical review of the sixth national communication of Monaco

Parties included in Annex I to the Convention are requested, in accordance with decision 9/CP.16, to submit a sixth national communication to the secretariat by 1 January 2014. In accordance with decision 7/CMP.8, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol shall include in their sixth national communication supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. In accordance with decision 15/CMP.1, these Parties shall start reporting the information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention for the first year of the commitment period. This includes supplementary information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

This report presents the results of the technical review of the sixth national communication and supplementary information under the Kyoto Protocol of Monaco conducted by an expert review team in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" and the "Guidelines for review under Article 8 of the Kyoto Protocol".

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I. Introduction and summary

A. Introduction

1. For Monaco, the Convention entered into force on 21 March 1994 and the Kyoto Protocol on 28 May 2006. Under the Convention, Monaco made a commitment to reducing its greenhouse gas (GHG) emissions by 30 per cent by 2020 below the 1990 level.[1] Under the Kyoto Protocol, Monaco committed itself to reducing its GHG emissions by 8 per cent compared with the base year level during the first commitment period, from 2008 to 2012. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, Monaco committed to reduce its GHG emissions by 22 per cent below the 1990 level.

2. This report covers the centralized technical review of the sixth national communication (NC6) of Monaco, coordinated by the secretariat, in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" (decision 23/CP.19) and the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1).

3. The review took place from 5 to 10 May 2014 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Eglantina Bruci (Albania), Mr. Øyvind Christophersen (Norway), Mr. Sorin Deaconu (Romania), Ms. Agnieszka Maria Janowska (Poland), Mr. Robert Jeszke (Poland), Mr. Bundit Limmeechokchai (Thailand), Ms. Jenny Mager (Chile), Mr. Erick Wamalwa Masafu (Kenya), Mr. Alexander Storch (Austria), Mr. Daniel Tutu Benefoh (Ghana), Mr. Goran Vukmir (Bosnia and Herzegovina) and Mr. Pavel Zámyslický (Czech Republic). Ms. Janowska and Mr. Tutu Benefoh were the lead reviewers. The review was coordinated by Mr. Matthew Dudley and Ms. Barbara Muik (secretariat).

4. During the review, the expert review team (ERT) reviewed each section of the NC6. The ERT also reviewed the supplementary information provided by Monaco as a part of the NC6 in accordance with Article 7, paragraph 2, of the Kyoto Protocol. In addition, the ERT reviewed the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, which was provided by Monaco in its 2013 annual submission and previous submissions and elaborated further in its 2014 annual submission under Article 7, paragraph 1, of the Kyoto Protocol.

5. In accordance with decisions 23/CP.19 and 22/CMP.1, a draft version of this report was communicated to the Government of Monaco, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Summary

6. The ERT conducted a technical review of the information reported in the NC6 of Monaco in accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on

[1] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for carbon dioxide, methane and nitrous oxide, and 1995 for perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride. The base year emissions include emissions from sectors/source categories listed in Annex A to the Kyoto Protocol.

national communications" (hereinafter referred to as the UNFCCC reporting guidelines on NCs). As required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol[2] is provided in the NC6 (see para. 95 below). The supplementary information on the minimization of adverse impacts referred to in paragraph 4 above is complete and transparent.

7. Monaco considered most recommendations provided in the report of the in-depth review of the fifth national communication (NC5) of Monaco.[3] The ERT commended Monaco for its improved reporting. During the review, Monaco provided further relevant information on national circumstances (see para. 14 below), PaMs (see paras. 30 and 56 below) and domestic legal arrangements regarding implementation of the Kyoto Protocol (see para. 25 below).

1. Completeness and transparency of reporting

8. Gaps and issues related to the reported information identified by the ERT are presented in table 1 below.

2. Timeliness

9. The NC6 was submitted on 4 April 2014, after the deadline of 1 January 2014 mandated by decision 9/CP.16. Monaco informed the secretariat about its difficulties with the timeliness of its NC6 on 18 December 2013 in accordance with paragraph 79 of the annex to decision 23/CP.19 and paragraph 139 of the annex to decision 22/CMP.1. As the NC6 was not submitted within six weeks after the due date (15 February 2014), the delay was brought to the attention of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol and the Compliance Committee and made public. The ERT noted with great concern the delay in the submission of the NC6.

10. Monaco submitted a revised NC6 to the secretariat on 14 April 2014 and an additional revised version on 11 July 2014. The ERT has used the 14 April 2014 version as the basis of this review, and noted the 11 July 2014 version.

3. Adherence to the reporting guidelines

11. The information reported by Monaco in its NC6 is mostly in adherence to the UNFCCC reporting guidelines on NCs as per decision 4/CP.5 (see table 1).

[2] Decision 15/CMP.1, annex, chapter II.
[3] FCCC/IDR.5/MCO.

Table 1

Assessment of completeness and transparency issues of reported information in the sixth national communication of Monaco[a]

Sections of national communication	*Completeness*	*Transparency*	*Reference to paragraphs*	*Supplementary information under the Kyoto Protocol*	*Completeness*	*Transparency*	*Reference to paragraphs*
Executive summary	Complete	Transparent		National systems	Complete	Transparent	
National circumstances	Complete	Mostly transparent	15	National registries	Complete	Transparent	
Greenhouse gas inventory	Complete	Transparent		Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	
Policies and measures (PaMs)	Complete	Mostly transparent	32	PaMs in accordance with Article 2	Mostly complete	Transparent	57
Projections and total effect of PaMs	Complete	Mostly transparent	74	Domestic and regional programmes and/or arrangements and procedures	Mostly Complete	Transparent	25
Vulnerability assessment, climate change impacts and adaptation measures	Mostly complete	Transparent	86	Information under Article 10[b]	NA	NA	
Financial resources and transfer of technology[c]	NA	NA		Financial resources[c]	NA	NA	
Research and systematic observation	Complete	Transparent		Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Transparent	
Education, training and public awareness	Complete	Transparent					

Abbreviation: NA = not applicable.

[a] A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in the chapter on conclusions and recommendations.

[b] For the purposes of reporting information in this table, this assessment refers to information provided by the Party on the provisions contained in Article 4, paragraphs 3, 5 and 7, of the Convention reported under Article 10 of the Kyoto Protocol, which is relevant for developed country Parties and other developed Parties included in Annex II to the Convention only. Assessment of the information provided by the Party on the other provisions of Article 10 of the Kyoto Protocol is provided under the relevant substantive headings under the Convention, for example research and systematic observation.

[c] Reporting on financial resources under the Kyoto Protocol is relevant for developed country Parties and other developed Parties that are included in Annex II to the Convention (Annex II Parties). As Monaco is not an Annex II Party, it does not have an obligation to provide information on financial resources under Article 11 of the Kyoto Protocol, including on "new and additional" resources.

II. Technical review of the reported information in the national communication and supplementary information under the Kyoto Protocol

A. Information on greenhouse gas emissions and national circumstances relevant to greenhouse gas emissions and removals, including other elements related to the Kyoto Protocol

1. Information on relevant national circumstances

12. In its NC6, Monaco has provided a concise description of the national circumstances and elaborated on the framework legislation and key policy documents on climate change. Further information on the review of the institutional and legislative arrangements for the coordination and implementation of policies and measures (PaMs) is provided in chapter II.B below. Table 2 illustrates the national circumstances of Monaco by providing some indicators relevant to GHG emissions and removals.

13. The NC6 does not include information on government structure (more specifically the roles and responsibilities of different levels of government in relation to climate change); economic profile (more specifically gross domestic product by sector, international trade patterns and energy by fuel type); market structure, prices, taxes and subsidies; and building stock and urban structure. In addition, information on how national circumstances affect GHG emissions and removals, and how national circumstances and changes in national circumstances affect GHG emissions and removals over time is limited in the NC6.

14. During the review, Monaco provided additional information on the national circumstances, elaborating on the various roles of the levels of government in relation to climate change and on building stock and urban structure (e.g. the profile of residential and commercial buildings). The ERT commends Monaco for providing the additional information.

15. The ERT encourages Monaco to improve completeness and transparency by elaborating in its next national communication (NC) on government structure and on economic profile, including information on gross domestic product (GDP) by sector, international trade patterns and energy by fuel type. The ERT recommends that Monaco improve the transparency of its NC by providing further information on how its national circumstances affect its GHG emissions and removals and how its national circumstances and changes therein affect GHG emissions and removals over time.

Table 2
Indicators relevant to greenhouse gas emissions and removals for Monaco

	1990	*2000*	*2005*	*2010*	*2011*	*Change 1990–2011 (%)*	*Change 2010–2011 (%)*
Population (thousand)	29.97	32.02	33.75	35.37	35.63	18.9	0.7
GDP (2005 USD billion using PPP)	NA	NA	NA	NA	NA	NA	NA
TPES (Mtoe)	NA	NA	NA	NA	NA	NA	NA
GHG emissions without LULUCF (kt CO_2 eq)	108.42	122.16	108.13	92.08	89.58	–17.4	–2.7

	1990	2000	2005	2010	2011	Change 1990–2011 (%)	Change 2010–2011 (%)
GHG emissions with LULUCF (kt CO_2 eq)	108.41	122.15	108.12	92.06	89.56	–17.4	–2.7
GDP per capita (2005 USD thousand using PPP)	NA	NA	NA	NA	NA	NA	NA
TPES per capita (toe)	NA	NA	NA	NA	NA	NA	NA
GHG emissions per capita (t CO_2 eq)	3.62	3.82	3.20	2.60	2.51	–30.7	–3.5
GHG emissions per GDP unit (kg CO_2 eq per 2005 USD using PPP)	NA	NA	NA	NA	NA	NA	NA

Sources: (1) GHG emission data: Monaco's 2013 GHG inventory submission, version 1.3; (2) Population: International Energy Agency.

Note: The ratios per capita are calculated relative to GHG emissions without LULUCF, the ratios are calculated using the exact (not and per GDP unit rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the table.

Abbreviations: GDP = gross domestic product, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not applicable, PPP = purchasing power parity, TPES = total primary energy supply.

2. Information on the greenhouse gas inventory, emissions and trends

16. Monaco has provided a summary of information on GHG emission trends for the period 1990–2011. This information is largely consistent with the 2013 national GHG inventory submission; however, the ERT identified a number of inconsistencies in the GHG data between the NC6 and CRF summary tables, including trend tables for emissions in carbon dioxide equivalent (CO_2 eq), which are provided in an annex to the NC6. These inconsistencies were explained by the Party to be a result of updated GHG emission data included in the NC6. During the review, the ERT took note of the recently submitted 2014 annual submission. Information on GHG emissions and trends contained in the 2013 national inventory submission is used as the basis for this report. The ERT encourages Monaco to ensure that the GHG emission data reported in its next NC are consistent with corresponding data and information contained in the annual GHG submission, and to also state which CRF version the GHG data are taken from.

17. Total GHG emissions[4] excluding emissions and removals from land use, land-use change and forestry (LULUCF) decreased by 17.4 per cent between 1990 and 2011, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 17.4 per cent over the same period. The key drivers for the trend include the reduction in the amount of waste incinerated for energy purposes (a key GHG emission category, comprising 34.7 per cent of the total emissions of Monaco). Other related drivers were thermal energy and fuel regulations in the residential sector, and regulations and improvements in waste disposal in energy facilities. This decrease also corresponds to a decrease in carbon dioxide (CO_2) emissions from the energy sector. Emissions of CO_2 decreased by 24.9 per cent during the period 1990–2011 and their share of total GHG emissions decreased from 97.6 per cent in 1990 to 88.4 per cent in 2011. Emissions of

[4] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding land use, land-use change and forestry (LULUCF), unless otherwise specified.

methane (CH_4) decreased by 35.9 per cent, while emissions of nitrous oxide (N_2O) increased by 54.6 per cent during the reported period. Emissions of fluorinated gases (F-gases) accounted for 7.9 per cent of total GHG emissions in 2011 reflecting their steep increase of 16.9 per cent since 1990. In 2011, the energy sector dominated total GHG emissions with a share of 90.7 per cent. An analysis of the drivers of GHG emission trends in each sector is provided in chapter II.B below. Table 3 provides an overview of GHG emissions by sector from 1990 to 2011.

Table 3

Greenhouse gas emissions by sector in Monaco, 1990–2011

	GHG emissions (kt CO_2 eq)				*Change (%)*		*Share[a] by sector (%)*	
Sector	*1990*	*2000*	*2010*	*2011*	*1990–2011*	*2010–2011*	*1990*	*2011*
1. Energy	107.20	115.84	84.38	81.22	–24.2	–3.8	98.9	90.7
A1. Energy industries	28.20	42.68	25.59	27.75	–1.6	8.5	26.0	31.0
A2. Manufacturing industries and construction	NA/NO	NA/NO	NA/NO	NA/NO	NA/NO	NA/NO	NA/NO	NA/NO
A3. Transport	33.37	36.76	26.15	26.61	–20.3	1.7	30.8	29.7
A4–A5. Other	45.42	36.34	32.62	26.84	–40.9	–17.7	41.9	30.0
B. Fugitive emissions	0.20	0.05	0.02	0.02	–89.6	–12.0	0.2	0.0
2. Industrial processes	0.47	5.11	6.41	7.16	1 438.3	11.7	0.4	8.0
3. Solvent and other product use	0.01	0.03	0.03	0.04	664.4	23.9	0.0	0.0
4. Agriculture	NA/NO	NA/NO	NA/NO	NA/NO	NA/NO	NA/NO	NA/NO	NA/NO
5. LULUCF	–0.01	–0.01	–0.02	–0.02	62.2	–1.0	0.0	0.0
6. Waste	0.75	1.18	1.25	1.16	53.7	–7.3	0.7	1.3
GHG total with LULUCF	**108.41**	**122.15**	**92.06**	**89.56**	**–17.4**	**–2.7**	**NA**	**NA**
GHG total without LULUCF	**108.42**	**122.16**	**92.08**	**89.58**	**–17.4**	**–2.7**	**100.0**	**100.0**

Note: The changes in emissions and the share by sector are calculated using the exact (not rounded) values and may therefore differ from values calculated with the rounded numbers provided in the table.

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not applicable, NO = not occurring.

[a] The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions that was offset by GHG removals through LULUCF.

3. National system

18. Monaco provided in its NC6 a description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). The description includes all the elements mandated by decision 15/CMP.1. The NC6 also contains a reference to the description of a national system provided in the report mandated by

decision 13/CMP.1, submitted in 2007.[5] The ERT took note of the review of the changes to the national system as reflected in the report of the individual review of the annual submission of Monaco submitted in 2013.[6] This change related a renovation of the contract with CITEPA (France) for the elaboration of the inventory.

4. National registry

19. In its NC6, Monaco has provided information on the national registry in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. The ERT took note of the review of the changes to the national registry as reflected in the report of the individual review of the GHG inventory of Monaco submitted in 2013. This change related to a change in the personnel responsible for the national registry.

5. Domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol

20. Monaco has reported in its NC6 comprehensive information on domestic and regional programmes and legislative arrangements and procedures related to the Kyoto Protocol.

21. The overall responsibility for climate change policymaking lies within the Department of the Environment of Monaco, and a number of national institutions are involved in the implementation of this policy.

22. Implementation of the Kyoto Protocol is underpinned by the Climate and Energy Plan, which addresses two major issues for Monaco: climate change and energy security. The main objectives of this plan, to be met by 2020, are: a 30 per cent reduction in GHG emissions (compared with 1990); a 20 per cent increase in energy efficiency in buildings (compared with 2007); and a 20 per cent share of final energy to come from renewable sources while maintaining a steady power consumption peak (compared with 2006).

23. The Department of the Environment (DOE) is part of the Ministry of Public Works, the Environment and Urban Development, which provides many of the tools for the coordination and facilitation of environmental policy and in particular for addressing climate change. The Ministry of Foreign Affairs and Cooperation is another important implementing agency and is in charge of implementing the international conventions and agreements ratified, such as the Kyoto Protocol and the clean development mechanism. With the creation of the DOE in 2008, Monaco has consolidated the skills needed to develop its environmental policy. The DOE defines the implementation of environmental policy, monitors environmental variables, and informs and educates the public on environmental issues.

24. The NC6 does not include clear and direct information required by the UNFCCC reporting guidelines on NCs on the procedures for addressing cases of non-compliance under domestic law for the programmes that Monaco has in place to meet its commitments under the Kyoto Protocol.

25. During the review, Monaco provided additional information, elaborating on information provided in relation to compliance to commitments under the Kyoto Protocol. The Party explained that the legal framework (Environmental Code) for compliance is implemented by the National Council, with tracking of GHG mitigation undertaken in

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[5] Monaco's initial report under the Kyoto Protocol. The report to facilitate the calculation of the assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol, available at <http://unfccc.int/national_reports/initial_reports_under_the_kyoto_protocol/items/3765.php>

[6] FCCC/ARR/2013/MCO.

accordance with the established procedures and performance indicators. The ERT recommends that Monaco provide detailed information on any domestic and regional legislative arrangements and enforcement and administrative procedures the Party has in place to meet its commitments under the Kyoto Protocol, including the legal authority for such programmes, how they are implemented, and procedures for addressing cases of non-compliance under domestic law in its next NC in order to improve transparency.

26. During the review, Monaco confirmed that no LULUCF activities relating to Article 3, paragraph 3, of the Kyoto Protocol occur in Monaco. However, the NC6 reported that preservation of biodiversity in Monaco is part of the Government's sustainable development policy. With this in mind, the Ministry of Public Works, the Environment and Urban Development has implemented a policy for the preservation of trees of all species and certain plants, such as palms.

B. Policies and measures, including those in accordance with Article 2 of the Kyoto Protocol

27. Monaco has provided in its NC6 comprehensive information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol.

1. Policies and measures related to implementation of commitments under the Convention

28. In its NC6, Monaco reported on its PaMs adopted, implemented and planned in achieving its commitments under the Convention. Monaco provided information on PaMs by sector and by gas and a description of the principal PaMs. Monaco has not provided information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals in accordance with the objective of the Convention. The NC6 contains a set of PaMs similar to, but broader than, those in the NC5 of Monaco.

29. In the NC6, Monaco provided updated information on the policies contained in the NC5. The NC6 details efforts at the national and international levels. Monaco points out that international cooperation, especially with France, is a pillar for environmental policy in the principality. Some PaMs are in fact regulations of France and the European Union (EU) but have direct impacts on Monaco's emissions (e.g. fuel measures). Monaco reported in the NC6 on the overall national arrangements implemented in order to monitor the PaMs, explaining that monitoring of climate-related measures in the principality is done by the Department of the Environment, and that it is a stated priority of the Climate and Energy Plan to develop performance indicators for those monitoring activities.

30. The NC6 provided limited information on the effect of some PaMs on the long-term GHG trends, and the effect of these PaMs on non-GHG emissions. In response to a question of the ERT during the review, Monaco explained that providing information on the effect of PaMs on the long-term trend is extremely complicated, and that the effect was attempted to be addressed in projections under the 'with measures' scenario. Further, the Party explained by example two broad benefits of PaMs in relation to non-GHG emissions, namely a decrease of more than 20 per cent in water consumption since 1990, thereby reducing non-CO_2 emissions from the water distribution network, and the stabilization of electricity consumption when compared with the 2005 level through energy efficiency measures. The ERT encourages Monaco to explore how to incorporate this information in future NC submissions, for at least the principal PaMs.

31. The ERT also noted that the NC6 did not elucidate whether any policy or measure could give rise to an increase in GHG emissions, nor did it provide information on the cost

of individual PaMs. In response to a question of the ERT during the review, Monaco explained that the Environment Code allows for monitoring of the aggregate effect of PaMs through the GHG inventory, which is also used to monitor emission trends. The ERT encourages Monaco to explore how to incorporate information on the effect of PaMs on non-GHG emissions and the cost of PaMs in its next NC submission.

32. The ERT found that the information reported on PaMs in the NC6 not to be organized entirely in line with the UNFCCC reporting guidelines on NCs. Monaco has provided a description of its policies by sector; however, when presented in a tabular format this information is not separated by sector. Nor does Monaco subdivide the descriptive information on PaMs by gas, but CTF table 3 attributes affected GHGs to specific PaMs. The ERT recommends that Monaco enhance the transparency of its reporting by organizing the reporting of PaMs by sector, subdivided by GHG (CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6)).

33. Some of the recommendations made in the previous review report were taken into consideration in order to improve reporting in the NC6, including the addition of summary policy tables by sector.

2. Policy framework and cross-sectoral measures

34. Monaco considers PaMs related to the climate and those related to energy to be equally relevant, given the particular context of Monaco; that is, its size and cross-border cooperation with France. Moreover, Monaco indicated to the ERT that because of its size there are no subnational or regional policies implemented in the country.

35. In its NC6, Monaco provided a list of PaMs which are the most effective in mitigation of climate change, with reported PaMs largely reducing energy consumption and transport emissions.

36. The key framework for climate and energy policy is the Climate and Energy Plan, with its ambitious targets for GHG emissions (30 per cent reduction compared with 1990 by 2020) and energy efficiency (20 per cent increase compared with 2007 by 2020). This plan has three identified lines of work: control energy demand; control local energy production; and reduce GHG emissions. In addition to the Climate and Energy Plan, the National Council is reviewing a new policy called the Environmental Code, which is planned to be the framework for all future regulations. This code has five key elements: (a) general objectives, which comply with the Convention and its Kyoto Protocol; (b) GHG emission inventories; (c) technology replacement for inefficient appliances; (d) development of renewable energy; and (e) application of environmental criteria in public policies.

37. Due to its size, Monaco has no territorial subdivision or sharing of expertise in climate-related policies; however, international and cross-border cooperation are key in the implementation of these policies, especially with France. Table 4 provides a summary of the reported information on the PaMs of Monaco.

Table 4
Summary of information on policies and measures reported by Monaco

Sectors affected	*List of key policies and measures*	*Estimate of mitigation impact (kt CO_2 eq)*
Policy framework and cross-sectoral measures	Environmental Code	NE
	Climate and Energy Plan	NE

Sectors affected	*List of key policies and measures*	*Estimate of mitigation impact (kt CO_2 eq)*
	Integration of sustainable development clause in the contracts of energy distribution	NE
Energy		
Energy supply	Optimization tonnages of waste incinerated	12.90
	Strengthening the central production of heat and cold in Fontvieille and extension of urban distribution	NE
Renewable energy	Reclassification of energy plant waste	1.50
	Development of solar photovoltaic energy	NE
	Purchase of renewable electricity	
Energy efficiency	Technical management of public buildings	NE
Residential and commercial sectors	Demolition and reconstruction	0.24
	Thermal regulation RT 2005	NE
	Subsidy for installation of solar thermal systems	NE
	Grant for roof insulation	NE
	Energy performance contracts	NE
Transport	Strengthening the rail links in Monaco	NE
	Soft mobility	NE
	Promotion of the use of bicycles and electric bicycles	NE
	Subsidy for purchasing clean vehicles	NE
Industrial processes	EU F-gas directive 2006/40/EC to manage HFC emissions from mobile air-conditioning systems	4.08
	Manage F-gas emissions from domestic fridges and freezers	0.02
Forestry	Tree Code	NE
	Preservation of Green Spaces	NE
Waste management	Energy recovery from household and other waste	NE
	Disposal of sewage sludge	NE

Source: Monaco's sixth national communication.

Note: The greenhouse gas reduction estimates given for some measures are reductions in carbon dioxide or carbon dioxide equivalent for 2020.

Abbreviations: EU = European Union, F-gas = fluorinated gas, HFC = hydrofluorocarbon, NE = not estimated.

3. Policies and measures in the energy sector

38. Between 1990 and 2011, GHG emissions from the energy sector decreased by 24.2 per cent (25.98 kt CO_2 eq), mainly owing to the reduction in the amount of waste

incinerated for energy purposes (a key GHG emission category, comprising 34.7 per cent of the total emissions of Monaco). Other related drivers were thermal energy and fuel regulations in the residential sector, and regulations and improvements in waste disposal in energy facilities. The trend in GHG emissions from fuel combustion showed notable decreases in transport (20.3 per cent or 6.76 kt CO_2 eq) and in energy use in other sectors (40.9 per cent or 18.59 kt CO_2 eq).

39. ***Energy supply***. France provides nearly all the electricity used in Monaco. Within the principality, energy is produced by seawater heat pumps and by waste incineration plants, at which, after peaking at 88,011 t waste incinerated in 2001, the waste incinerated has in recent years decreased to 50,000 t waste incinerated per year. The incineration capacity has been set at a maximum of 45,000 t waste per year to ensure adherence to a GHG emission cap and the correct operational conditions of the facility.

40. ***Renewable energy sources***. Monaco has used its coastline to situate more than 60 seawater heat pumps. Monaco is a pioneer in the use of this technology and the plants produce 15–20 per cent of the final energy consumption. These plants together generate about 176,000 MWh per year. With regard to traditional renewable energy sources, the NC6 provided information on a subsidy to be implemented in 2014 to promote the development of solar photovoltaic energy.

41. ***Energy efficiency***. Many of the PaMs presented in the NC6 are related to energy efficiency, especially those measures implemented in public buildings. An example is the technical management (e.g. building management systems) of public buildings to control energy expenditure in them. Up to 2013, the following results were achieved: 5.3 GWh per year savings in consumption by government buildings; savings on energy bills of EUR 530,000 per year; 32 per cent reduction in total consumption in public buildings; and use of 686 MWh of renewables per year.

42. ***Residential and commercial sectors***. Several PaMs have been implemented to control the energy consumed by residential buildings. Monaco has adopted policies for new buildings; for example, a thermal regulation that sets the thermal characteristics of new buildings was established in 2012; and an ordinance that bans heating oil in all new buildings in order to accelerate the shift to natural gas and electricity was established in 2003. Measures related to existing buildings implemented by Monaco are subsidies for the installation of solar thermal systems to replace oil boilers; grants for roof insulation; and reconstruction of old facilities.

43. ***Transport sector***. Emissions from the transport sector are influenced not only by activities under Monaco's control, but also by external factors, as Monaco is an important economic centre in the region. National PaMs for the transport sector are organized around the Urban Transport Plan, which address the following issues: traffic calming measures in neighbourhoods that are designed to deter traffic; greater market share of cleaner fuels in the transport energy mix; and creation of traffic-free public spaces. Several public transportation measures have been implemented since 2007, including fares and network coverage, the purchasing new public transport vehicles, increasing the operation and frequency of public transport; and increasing the share of biofuels in the public transport fleet. The ERT noted that Monaco did not include information in its NC6 on the impact of these public transport measures on GHG and non-GHG emissions, whereas non-GHG effects of freight transport measures are provided.

44. Other important policies related to the transport sector are strengthening the railway system, the promotion of soft mobility (walking and riding bicycles) and measures to encourage the use of clean vehicles.

45. ***Industrial sector***. The industry sector accounted for 5.6 per cent of GDP in 2012, a decline of 8 per cent since 2011. Monaco has a relatively diverse industrial sector with

about 1,950 light industries covering food manufacturing, production of electrical equipment, printing and packaging, mechanics and pharmaceuticals. Monaco reported that the industry sector is not energy intensive and therefore it has not reported any PaMs targeting energy.

4. Policies and measures in other sectors

46. Between 1990 and 2011, GHG emissions from industrial processes (including solvent and other product use) and waste increased by 582.0 per cent (7.14kt CO_2 eq), mainly owing to a sharp increase in HFCs. No agriculture emissions were reported.

47. ***Industrial processes***. Between 1990 and 2011, GHG emissions from the industrial processes sector increased by 1,429 per cent (6.73 kt CO_2 eq), mainly owing to the increase in HFC emissions.

48. There are F-gas measures reported in NC6 that relate to French and European regulations on the replacement of refrigerants in motor vehicles and other equipment. Monaco has indicated that additional measures are being finalized by France that will affect F-gas emissions.

49. ***LULUCF***. The LULUCF sector was a net sink of 0.02 kt CO_2 eq in Monaco in 2011 and net GHG removals have increased by 62.2 per cent since 1990. The trend was mainly driven by conservation policies and preservation of green spaces.

50. The Preservation of Green Spaces measure (Sovereign Order 3647) aims to increase green space from 35 to as high as 65 per cent of a land parcel or a road side. Monaco has also reported a Tree Code measure (Sovereign Order 3197), which defines action to manage and conserve heritage trees in the principality.

51. Monaco has also developed a "Commitment Against Deforestation" by incorporating sustainable criteria in economic development, and also supports the regeneration of forests with a view to realizing both economic and environmental benefits.

52. ***Waste management***. Between 1990 and 2011, GHG emissions from the waste sector increased by 53.7 per cent (1.16 kt CO_2 eq), mainly driven by an increase in the amount of sewage sludge produced in the principality.

53. Monaco has reported numerous measures in the waste sector, including existing measures regarding waste-to-energy plant (i.e. waste incinerator) and technological process improvements applied to the facility thereafter; limiting the amount of waste incinerated per annum (to 45,000 t); waste separation and diversion through improved kerbside collection; encouraging waste separation at industrial sites; and the disposal of sewage sludge to the waste incinerator.

5. Policies and measures related to implementation of commitments under the Kyoto Protocol

54. Monaco reported on its package of PaMs adopted, implemented and elaborated in achieving its commitment under the Kyoto Protocol.

55. The NC6 reported that Monaco is a member of the European Civil Aviation Conference and thereby fully supports the efforts of the International Civil Aviation Organization (ICAO) to address environmental concerns, including the strategic challenge of climate change for sustainable development of international air transport. No information has been provided in the NC6 related to decisions taken by the International Maritime Organization (IMO) in order to limit or reduce GHG emissions.

56. During the review, Monaco provided additional information, noting that it has been a member of IMO since 1989; it adheres to the provisions of the International Convention

for the Prevention of Pollution from Ships (MARPOL Convention); and it practices transboundary cooperation with France and Italy on seawater quality and sustainable development of the coastline under the RAMOGE Accord. Monaco does not have a merchant navy or ship construction activities that would have an impact on GHG emissions and cause air pollution. The main shipping activities are private yachting and commercial activity related to the docking of cruise ships. Monaco does not operate large ship (cruise ship) refuelling facilities. Yacht refuelling (diesel) is accounted for in both marine bunker and national navigation.

57. The ERT recommends that Monaco provide information on any steps taken by it to promote and/or implement any decisions taken by ICAO and IMO in its next NC in order to improve transparency.

58. In its NC6, Monaco reported information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on international trade and social, environmental and economic impacts, on other Parties, especially developing country Parties. Further information on how Monaco strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, as reported in the 2013 annual submission, is presented in chapter III.B below.

C. Projections and the total effect of policies and measures, including information on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

59. In its NC6, Monaco has provided projections for all direct GHG emissions under a 'without measures' and a 'with measures' scenario until 2030.

1. Projections overview, methodology and key assumptions

60. The GHG emission projections provided by Monaco in the NC6 include a 'with measures' and a 'without measures' scenario until 2020 and 2030, presented relative to actual inventory data for 1990, 1995, 2000, 2005, 2010 and 2011. Projections are presented on a sectoral basis, using the same sectoral categories used in the PaMs section and on a gas-by-gas basis for all the following GHGs: CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs, HFCs and SF_6 collectively in each case). Projections are also provided in an aggregated format for each sector as well as for a national total, using global warming potential values from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report. Emission projections related to fuel sold to ships and aircraft engaged in international transport were reported separately and not included in the totals. The ERT noted that Monaco did not provide a clear explanation of the starting point of the projections in the NC6. During the review, Monaco indicated that the projections were developed on the basis of emissions in 2011 – the latest year for which inventory data are available in the NC6. The ERT encourages Monaco to improve the transparency of its reporting by providing this information in its next NC.

61. The ERT noted that in its NC6 Monaco has reported a 'with measures' scenario, which encompasses all currently implemented PaMs and also measures taken by the EU and France, as these have a direct effect on the GHG emissions of Monaco, and a 'without measures' scenario. However, the ERT noted that there is no 'with additional measures' scenario in the NC6. The ERT encourages Monaco to present a 'with additional measures' scenario that encompasses the currently planned PaMs in its next NC.

62. The reported scenarios have been developed within the framework of Monaco's national target to reduce its total GHG emissions by 30 per cent by 2020 compared with the 1990 level of emissions. The reported scenarios are built on assumptions relating to sectors such as energy, transport and waste. The main assumptions, which Monaco used in the 'with measures' scenario, are as follows: the consumption of light oil fuel used for heating in residential buildings and heavy oil used in the energy plant Fontvieille will decrease over time and will be gradually replaced by natural gas (there is also an intention to increase capacity by installation of heat pumps); the waste incineration plant will work with a limited tonnage of waste; and road fuel sales will decline while a constant decrease is expected in the number of vehicles.

63. Monaco provided information on the changes since the NC5 in the methodology used to develop the GHG emission projections. In particular, for the NC6 Monaco has developed and used a 'without measures' and a 'with measures' scenario, whereas for the NC5 a more simplistic approach was used, whereby the projections were made according to assumptions relating to the success of some key sectoral measures (reference, optimistic and conservative scenarios). However, the ERT noted that the NC6 contained limited information on the methodology used to develop the GHG emission projections, with the provided information limited to what 'drivers' (i.e. proxies) were used as a basis to project emissions (e.g. population). The approach used by Monaco is generally consistent with the UNFCCC reporting guidelines on NCs. The NC6 contains limited information on the underlying data used to generate the GHG emission projections, specifically the basis and rationale for the selection and use of 'drivers' to project emissions, such as emission trends, population growth, growth in vehicle stock and forecasts in development (houses and buildings). The ERT encourages Monaco to improve the transparency of its reporting by exploring how to include in its next NC more detailed information on the 'drivers' and associated data used to generate the GHG emission projections.

64. The ERT noted the underlining assumptions used for the scenarios reported by Monaco in the NC6, and additional information provided to the ERT during the review on the drivers of emission projections including key macroeconomic indicators and energy prices. An underlying assumption regarding GDP growth was that it would be in line with what has been observed in recent years; hence a regular but moderated growth in the economy. Monaco was not able to develop its own projections of oil prices; hence it was assumed that influential factors would be sensibly steady into the near future. The ERT found this assumption to be in the middle ground as it allows for the consideration of both a drop in oil prices and the inverse, where a strong increase could have some influence on emissions. As regards electricity, Monaco followed the French assumption that electricity prices would increase by 5 per cent each year until approximately 2019.

65. The ERT encourages Monaco to improve the consistency of its reporting between the PaMs and projections sections, and to include, in its next NC, the information on all key assumptions and drivers (for instance key macroeconomic indicators and energy prices) affecting projected emission trends that was provided to the ERT during the review.

66. The ERT noted that, in its NC6, Monaco has not reported on the sensitivity analysis of its scenarios. In response to a question of the ERT during the review, Monaco explained that a qualitative analysis of all activity data has been performed. This analysis identified that activity data is heavily influenced by macroeconomic indicators such as oil price and GDP. The ERT encourages Monaco to report on the sensitivity analysis in its next NC.

2. Results of projections

67. Monaco has committed itself to reducing its GHG emissions by 8 per cent compared with the base year level during the first commitment period of the Kyoto Protocol (2008–2012). This means that it had to limit its total GHG emissions to 99.05 kt CO_2 eq per year

on average during the period 2008–2012. The ERT noted that according to the 2013 annual submission, total GHG emissions, excluding LULUCF, in 2011 were 89.58 kt CO_2 eq or 16.8 per cent below the base year level. Monaco seems to be on track to meet its Kyoto Protocol target by domestic PaMs only. The ERT noted that, in a very small state and economy such as Monaco, total GHG emissions could change dramatically from one year to the next. Nevertheless, emissions have shown a downward trend since 2000.

68. Monaco committed itself to reducing its total GHG emissions by 30 per cent by 2020 compared with the 1990 level. Consequently, Monaco's quantified emission limitation and reduction objective for the second commitment period of the Kyoto Protocol has been set at an average emission reduction of 22 per cent within the period 2013–2020. According to the 2013 annual submission, a 30 per cent emission reduction would mean limiting total GHG emissions, excluding LULUCF, to 75.89 kt CO_2 eq per year by 2020.

69. Under the two scenarios reported in the NC6, Monaco does not appear to be in a position to reach its emission reduction target for the second commitment period of the Kyoto Protocol by domestic PaMs alone, as total GHG emissions in 2020 are expected to reach 82.1 kt CO_2 eq under the 'with measures' scenario and 100.3 kt CO_2 eq under the 'without measures' scenario. In its NC6, Monaco did not report on how it specifically expects to achieve its 2020 target; however, it did indicate that the use of the Kyoto Protocol mechanisms is a possibility. The ERT noted that in order to meet its 2020 emission reduction target, Monaco might need to put in place additional PaMs and/or make use of the Kyoto Protocol mechanisms. The ERT encourages Monaco to report on any additional PaMs and its intended use of Kyoto Protocol mechanisms as applicable in the context of its 2020 target in its next NC.

70. According to the NC6, CO_2 emissions in 2030 are projected to be 74.8 kt CO_2 eq under the 'with measures' scenario, which is 31.0 per cent below the 1990 (base year) level. Under the 'with measures' scenario, the relative contributions of the different gases to the principality's total GHG emissions (in CO_2 eq) are: 93.7 per cent for CO_2 in 2010, decreasing to 87.2 per cent in 2020 and 85.4 per cent in 2030; 0.63 per cent for CH_4 in 2010, decreasing slightly to 0.58 per cent in 2020 but increasing to 0.61 per cent in 2030; 3.1 per cent for N_2O in 2010, increasing to 3.2 per cent in 2020 and 3.5 per cent in 2030; and 2.6 per cent for F-gases in 2010, increasing rapidly to 9.1 per cent in 2020 and further decreasing to 10.5 per cent in 2030. LULUCF GHG removals or emissions have not been projected.

71. The sectoral projections under the 'with measures' scenario include a 16.1 and 21.3 per cent reduction in GHG emissions from the energy sector by 2020 and 2030, respectively, when compared with the 1990 level. GHG emissions from transport are projected to decrease by 27.5 and 33.2 per cent by 2020 and 2030, respectively. The key drivers for these trends in the energy projections are a shift from the use of heavy oil (industry) and heating oil (residential) to natural gas, and the increase in the market share of green vehicles with better fuel consumption performance. Emissions are projected to increase by 2020 and 2030, when compared with in 1990, from both the industrial processes (by 2,017.4 and 2,523.9 per cent, respectively) and the waste (by 70.7 and 90.7 per cent, respectively) sectors. Emissions of F-gases are driving the increase in industrial process emissions, while population growth underpins the projected increase in waste sector emissions.

72. The projected emission levels under different scenarios and information on the Kyoto Protocol targets and quantified economy-wide emission reduction target are presented in table 5 and the figure below.

Table 5
Summary of greenhouse gas emission projections for Monaco

	Greenhouse gas emissions (kt CO_2-eq per year)	*Changes in relation to the base year[a] level (%)*	*Changes in relation to the 1990 level (%)*
Kyoto Protocol base year[b]	107.66	NA	0.7
Kyoto Protocol target for the first commitment period (2008–2012)	99.05	–8.0	–8.6
Kyoto Protocol target for the second commitment period (2013–2020)	83.97	–22.0	–22.5
Quantified economy-wide emission reduction target under the Convention	75.89	–29.5	–30.0
Inventory data 1990[c]	108.42	0.7	NA
Inventory data 2011[c]	89.58	–16.8	–17.4
Average annual emissions for 2008–2011[c]	94.30	–12.4	–13.0
'Without measures' projections for 2020[d]	100.30	–6.8	–7.5
'With measures' projections for 2020[d]	82.10	–23.7	–24.3
'With additional measures' projections for 2020[d]	NA	NA	NA
'Without measures' projections for 2030[d]	97.30	–9.6	–10.3
'With measures' projections for 2030[d]	74.80	–30.5	–31.0
'With additional measures' projections for 2030[d]	NA	NA	NA

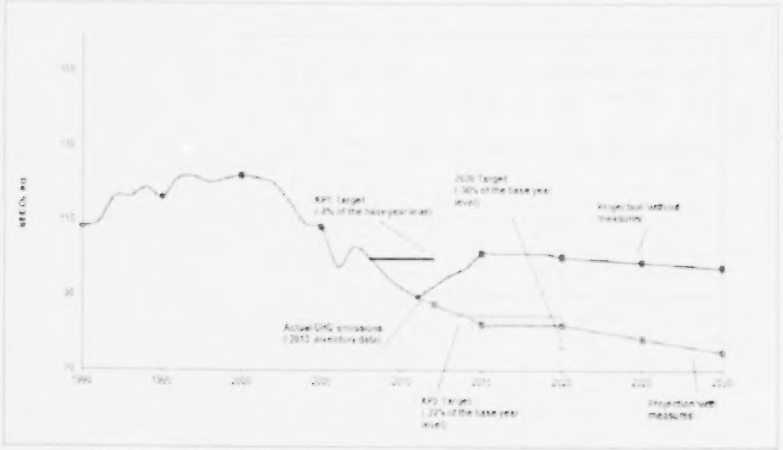
[a] "Base year" in this column refers to the base year used for the target under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target.

[b] The Kyoto Protocol base year level of emissions is provided in the initial review report contained in document FCCC/IRR/2007/MCO.

[c] Monaco's 2013 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry.

[d] Monaco's sixth national communication and/or first biennial report.

Greenhouse gas emission projections



Sources: (1) Data for the years 1990–2011: Monaco's 2013 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry. (2) Data for the years 2012–2030: Monaco's sixth national communication and/or first biennial report; the emissions are without land use, land-use change and forestry.

Note: The target for the second commitment period of the Kyoto Protocol is based on preliminary estimates of the base year emissions for the first commitment period of the Kyoto Protocol and quantified emission limitation or reduction objective included in annex I to decision 1/CMP.8. The initial assigned amount for the second commitment period will be established after the initial review for the second commitment period of the Kyoto Protocol.

Abbreviations: GHG = greenhouse gas, KP1 = first commitment period of the Kyoto Protocol, KP2 = second commitment period of the Kyoto Protocol.

3. Total effect of policies and measures

73. In the NC6, Monaco presented the estimated and expected total effect of implemented and adopted PaMs, in accordance with the 'with measures' definition, compared with a situation without such PaMs – a 'without measures' scenario.

74. Although the NC6 included projections for all gases for 2020 and 2030, which allows the quick calculation of the expected total effect of PaMs by gas, the NC6 did not include specific information on the total effect of PaMs by gas in the section dedicated to those results. Further, Monaco did not include this information for the 'with additional measures' scenario. The ERT therefore recommends that Monaco enhance the transparency of its reporting by including the total effect of PaMs by gas in the section of its NC that is dedicated to reporting this information or by making an explicit reference to these effects in the relevant section of its NC where they can be found. The ERT also encourages Monaco to report the expected effect of planned PaMs as part of a 'with additional measures' scenario.

75. The trajectory of emission reductions that has been calculated for 2020 shows a 1.40 kt CO_2 eq reduction per year for the 'with measures' scenario and a 0.25 kt CO_2 eq reduction per year for the 'without measures' scenario. Over the period 2020–2030, the projected reduction is 0.73 kt CO_2 eq per year 'with measures' and 0.29 kt CO_2 eq per year 'without measures'.

76. Monaco reported that the total estimated effect of adopted and implemented PaMs is 18.2 kt CO_2 eq in 2020 and 22.5 kt CO_2 eq in 2030. According to the information reported in the NC6, PaMs implemented in the energy sector will deliver the largest emission reductions, followed by the effect of PaMs implemented in the industrial processes sector. The most effective PaMs and drivers behind GHG emission reductions are described in chapter II.B above. Table 6 provides an overview of the total effect of PaMs as reported by Monaco.

Table 6
Projected effects of planned, implemented and adopted policies and measures in 2020 and 2030

Sector	*Effect of implemented and adopted measures (kt CO_2 eq)*	*Relative value (% of 1990 emissions)*	*Effect of planned measures (kt CO_2 eq)*	*Relative value (% of 1990 emissions)*	*Effect of implemented and adopted measures (kt CO_2 eq)*	*Relative value (% of 1990 emissions)*	*Effect of planned measures (kt CO_2 eq)*	*Relative value (% of 1990 emissions)*
	2020				*2030*			
Energy (without transport)	16.0	14.9	NA	NA	18.4	17.1	NA	NA
Transport	0.0	–	NA	NA	0.0	–	NA	NA
Industrial processes	2.2	2.0	NA	NA	4.1	3.8	NA	NA
Agriculture	NA	NA	NA	NA	NA	NA	NA	NA
Land-use change and forestry	0.0	–	NA	NA	NA	NA	NA	NA
Waste management	0.0	–	NA	NA	0.0	–	NA	NA
Total	**18.2**	**16.9**	NA	NA	**22.5**	**20.9**	NA	NA

Source: Monaco's sixth national communication.

Note: The total effect of implemented and adopted policies and measures is defined as the difference between the 'without measures' and 'with measures' scenarios.

Abbreviation: NA = not available.

4. Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

77. In its NC6, Monaco stated that the Party expects to achieve its target for the first commitment period of the Kyoto Protocol, 2008–2012, without the use of Kyoto Protocol mechanisms, although it did not elaborate on supplementarity as such. However, the ERT noted that in order to meet its 2020 emission reduction target, Monaco might need to put in place additional PaMs and/or make use of the Kyoto Protocol mechanisms. Therefore, the ERT encourages Monaco to enhance information reported on supplementarity by providing, as appropriate detailed information on its intentions to use market-based mechanisms to fulfil the 2020 target in its next NC.

D. Provision of financial resources and technology transfer to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol

1. Financial resources, including "new and additional" resources and resources under Article 11 of the Kyoto Protocol

78. Monaco is a Party not included in Annex II to the Convention (non-Annex II Party) and is therefore not obliged to adopt measures and fulfil obligations as defined in Article 4, paragraphs 3, 4 and 5, of the Convention. However, in its NC6, Monaco provided information on provision of support required under the Convention and its Kyoto Protocol. Since Monaco is a non-Annex II Party, it has submitted this information voluntarily.

79. In its NC6, Monaco provided details on measures taken to give effect to its commitments under Article 4, paragraphs 3, 4 and 5, of the Convention as required by the UNFCCC reporting guidelines on NCs and under Article 11 of the Kyoto Protocol, as required by the "Guidelines for the preparation of information required under Article 7 of the Kyoto Protocol". Monaco has indicated what "new and additional" financial resources it has provided pursuant to Article 4, paragraph 3, of the Convention and is commended for providing this information. Information reported includes financial resources related to the implementation of the Convention provided through bilateral, regional and other multilateral channels in mitigation projects in the areas of energy, industry and agriculture. The ERT noted that the transparency of this information could be enhanced by clarifying how it has determined such resources as being "new and additional".

80. Monaco has reported information on the assistance it has provided to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them meet the costs of adaptation to those adverse effects. Further, Monaco has indicated that its financing has focused on the African continent and targets the least developed countries, such as Burkina Faso, Burundi, Haiti, Mali, Mauritania, Madagascar and Timor-Leste. Financing is mainly through bilateral cooperation, with a view to addressing environmental protection, health, capacity-building, protection of children and human rights.

81. Monaco signed a memorandum of understanding with Tunisia in 2011 in promoting the clean development mechanism as a means to implement projects in the energy and industry sectors. This arrangement was extended in 2012 to include support for the development of nationally appropriate mitigation actions (NAMAs).

82. Monaco has provided information on its financial contribution to the Adaptation Fund, established in accordance with decision 10/CP.7. Table 7 summarizes information on financial resources and technology transfer.

Table 7
Summary of information on financial resources and technology transfer for 2009–2012
(Euros)

Allocation channel of public financial support	*Years of disbursement*				
	2009	*2010*	*2011*	*2012*	*2013*
Contributions through bilateral and regional channels and others			332 026	166 540	

2. Technology transfer, including information under Article 10 of the Kyoto Protocol

83. Monaco has provided in its NC6 information on a pilot irrigation project utilizing photovoltaic technology that was established in Morocco in 2011.

E. Vulnerability assessment, climate change impacts and adaptation measures

84. In its NC6, Monaco has provided the required information on the expected impacts of climate change in the principality, focusing on the assessment of the changes in temperature and precipitation patterns and on impact assessment of energy needs and changes in bioclimatic characteristics. An impact assessment for the current situation was limited to the human health, natural ecosystems and water supply sectors. However, the ERT noted that Monaco did not provide information on the expected impacts of climate change in Monaco or an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation.

85. The ERT identified that the NC6 did not elaborate in great detail on vulnerability assessments undertaken or on any activities concerning adaptation. During the review, Monaco explained that these activities are in their infancy (the first study started in 2014); hence no specific adaptation measures have been identified or planned for implementation. Nevertheless, Monaco explained that climate change issues are considered in planning and development processes, including those related to urban planning, construction and energy planning. Monaco also explained that some adaptation response measures have been implemented already; for example, energy efficiency in buildings.

86. The ERT recommends that Monaco enhance its reporting of information on vulnerability and adaptation assessment in its next NC, including information on the expected impacts of climate change in Monaco and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. Table 8 summarizes the information on vulnerability and adaptation to climate change presented in the NC6.

Table 8
Summary of information on vulnerability and adaptation to climate change

Vulnerable area	*Examples/comments/adaptation measures reported*
Energy	*Vulnerability*: According to the analysis of climate projection contained in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, winters will be temperate. As a consequence, the energy demand for heating will decrease and that for cooling will increase
	Adaptation: No specific measures have yet been implemented
Ecosystems	*Vulnerability*: Bioclimatic conditions are likely to change because of expected changes in temperature and precipitation patterns. Some changes in ecosystems have already been observed, such as the proliferation of filamentous algae and other exotic species
	Adaptation: No specific measures have yet been implemented
Coastal zones	*Vulnerability*: Sea level increases are likely, as are increases in the frequency and duration of extreme events (especially storm surges) and increases in the risk of flooding of the coastal area as a result of storm surges and sea level rise
	Adaptation: Conducting studies on environmental impacts (i.e. a 'soft' adaptation measure)

Vulnerable area	*Examples comments, adaptation measures reported*
Water resources	*Vulnerability*: Reduction in summer precipitation will lead to reduction of water supplies *Adaptation*: Measures to maintain local water production and reduce water consumption are already starting to be implemented

87. The ERT notes that Monaco has progressed in its assessment of climate change vulnerability since the NC5. Increases in annual temperature, compared with the reference period 1950–2000, and especially changes in the seasonal patterns (winter and summer) projected by A2 and B2 scenarios,[7] will lead to changes in energy demand for heating and cooling. Although large changes in total annual precipitation are not expected, drastic reduction in summer and increase in winter, associated with sea level increase and extreme events, may cause problems for coastal zone activities, drinking water supply and ecosystems.

88. Given that Monaco's first study on climate vulnerability and adaptation was initiated only in early 2014, the principality has still not made any progress on cooperation with Parties not included in Annex I to the Convention in preparing for adaptation. The ERT encourages Monaco to report on progress in this regard in its next NC.

F. Research and systematic observation

89. Monaco has provided information on its actions relating to research and systematic observation, including domestic activities and cooperation with international institutions. However, the ERT noted that, due to its small size and limited resources, Monaco's engagement in international activities is limited, but focused on marine and water research and observation.

90. The NC6 does not include information on international activities relating to research and systematic observation, such as for example the World Climate Programme, the International Geosphere–Biosphere Programme, the Global Climate Observing System and the IPCC. The ERT encourages Monaco to include this information in its next NC. The NC6 does not include information on action taken to support related capacity-building in developing countries. The ERT encourages Monaco to provide such information in its next NC.

91. In its NC6, Monaco has reported on its monitoring systems for air quality, seawater quality and sea level; monitoring programmes for terrestrial and marine biodiversity; and biodiversity mapping project. Monaco has also reported on various international engagements and partnerships, particularly on the close collaboration with Météo-France on weather forecasting, the Data Rescue project and marine water quality monitoring.

G. Education, training and public awareness

92. In the NC6, Monaco has provided information on its actions relating to education, training and public awareness at the domestic level. Compared with in the NC5, the Party provided more extensive information on education, training and public awareness policies, including education in schools, communication campaigns, periodical publications on environmental issues, and climate change training in the public service system. Information on participation in international activities is provided as well.

[7] Further information on IPCC scenarios is available at <www.ipcc.ch>.

93. The ERT notes that, in contrast with the NC 5, which reports on good efforts taken by Monaco in relation to awareness raising and climate change initiatives in developing countries, the NC 6 does not provide information on the progress made during the reporting period. The ERT encourages Monaco to include this information in its next NC.

94. In Monaco, education is coordinated by the State Directorate of National Education, Youth and Sport, which implements programmes and actions relating to the environment and sustainable development as a part of its curriculum. Non-governmental organizations and the private sector play an important role in education, training and public awareness on energy and climate issues. A series of communication campaigns have been organized, such as Ecowat, aimed at reducing energy consumption in winter; a campaign for roof insulation to reduce heat loss; and a campaign for sustainable tourism.

III. Summary of reviewed supplementary information under the Kyoto Protocol

A. Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

95. Supplementary information provided by Monaco under Article 7, paragraph 2, of the Kyoto Protocol in its NC6 is complete and mostly transparent. The supplementary information is located in different sections of the NC6. Table 9 provides an overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol as well as references to the NC6 chapters in which this information is provided.

96. The technical assessment of the information reported under Article 7, paragraph 2, of the Kyoto Protocol is contained in the relevant sections of this report.

Table 9
Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

Supplementary information	*Reference to the sixth national communication*
National registry	Chapter 3.4
National system	Chapter 3.2
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Chapter 5.4
Policies and measures in accordance with Article 2	Chapter 4
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Chapter 4.1
Information under Article 10	Chapters 4 and 6–9
Financial resources	Chapter 7

B. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

97. Monaco reported the information requested in section H, "Minimization of adverse impacts in accordance with Article 3, paragraph 14", of the annex to decision 15/CMP.1 as a part of its 2013 annual submission. During the review, Monaco provided the ERT with additional information on how it strives to implement its commitments under Article 3,

paragraph 14, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. Its commitments include working with Mongolia with regard to agricultural production, and with the United Republic of Tanzania in the formulation of NAMAs. The ERT considers the reported information to be complete and transparent. The ERT commends Monaco for the additional information provided and encourages the Party to continue exploring and reporting on the adverse impacts of response measures.

IV. Conclusions and recommendations

98. The ERT conducted a technical review of the information reported in the NC6 of Monaco according to the UNFCCC reporting guidelines on NCs. The ERT concludes that the NC6 provides a good overview of the national climate policy of Monaco. The information provided in the NC6 includes all elements of the supplementary information under Article 7 of the Kyoto Protocol.

99. Monaco's emissions for 2011 were estimated to be 17.4 per cent below its 1990 level excluding LULUCF and also 17.4 per cent below 1990 level when LULUCF emissions are included. Emission decreases were driven mainly by changes in the energy sector corresponding to the amount of waste available for energy use and changes in the use of oil and natural gas for heating. These factors outweighed the increase in emissions in other key GHG sectors.

100. Based on the comparison of the Party's target and its average annual emissions for the period 2008–2011, Monaco's average emissions for the period 2008–2012 are 12.4 per cent below the base year level and the Party is therefore on track to meet its Kyoto Protocol target for the first commitment period (8 per cent emission reduction compared with the base year level).

101. In the NC6, Monaco presents GHG emission projections for the period from 1990 to 2030. Two scenarios are included: baseline ('without measures') and 'with measures'. The projected GHG emission levels under the 'with measures' scenario for 2020 and 2030 are 24.3 per cent and 31.0 per cent below the 1990 emission level, respectively.

102. Projections data reported by Monaco indicate that it is not in a position to meets its 2020 target (22 per cent emission reduction compared with 1990 level) for the second commitment period under the Kyoto Protocol under the 'with measures' scenario. GHG emissions are projected to exceed the 2020 target under the Convention of a 30 per cent reduction compared with 1990. Hence, Monaco will need to explore additional PaMs and/or the use of market-based mechanisms to achieve its 2020 target.

103. The NC6 contains limited information on how any future use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol would be supplemental to domestic action, and Monaco did not elaborate on supplementarity as such. However, Monaco is not planning to make use of the Kyoto Protocol mechanisms to meet its target for the first commitment period (2008–2012) of the Kyoto Protocol.

104. The NC6 provides information on PaMs adopted and planned by Monaco in order to meet its commitments. Due to the size of the principality, cross-border and international cooperation has an important role in policy formulation, and policies of the EU and France are particularly relevant. In the NC6 Monaco explained that the measures designed for reducing emissions are strongly linked to energy and mobility (i.e. transport) policies. The main policy in this regard is the Climate and Energy Plan, which sets ambitious targets for GHG emission reduction and increasing energy efficiency. In addition to the Climate and

Energy Plan, a new policy, the Environmental Code, is under review and is planned to be the framework for all future regulations in Monaco.

105. Although Monaco is a non-Annex II Party and therefore not obliged to adopt measures and fulfil obligations as defined in Article 4, paragraphs 3, 4 and 5, of the Convention, it has voluntarily included in its NC6 information on financial resources and technology transfer.

106. The ERT found that Monaco has improved its reporting of information on vulnerability assessment, climate change impacts and adaptation measures since its NC5. Monaco has reported on the assessment of the impact of climate change on the health, ecosystems and water supply sectors, but it did not apply that assessment to look at future impacts, nor did the Party outline any action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. No specific adaptation measures have been implemented; however, in 2014 the Party initiated a study to clarify its adaptation response measures.

107. Monaco has provided information on research and systematic observation, including domestic activities and international cooperation. Due to its small size and limited resources, Monaco's engagement in international activities is limited and focused on marine and water research and monitoring.

108. The NC6 provides extensive information on education, training and public awareness policies, including education in schools, communication campaigns, periodical publications on environmental issues, and climate change training in the public service system. Information on participation in international activities is provided as well.

109. Monaco has reported information on the minimization of adverse impacts, including how it gives priority to the actions taken in implementing its commitments under Article 3, paragraph 14, of the Kyoto Protocol.

110. In the course of the review, the ERT formulated several recommendations relating to the completeness and transparency of Monaco's reporting under the Convention and its Kyoto Protocol. The key recommendations[8] are that Monaco:

(a) Improve the completeness of its reporting by including in its next NC the following:

(i) More detailed information on any domestic and regional legislative arrangements and enforcement and administrative procedures that the Party has in place to meet its commitments under the Kyoto Protocol, including the legal authority for such programmes, how they are implemented, and procedures for addressing cases of non-compliance under domestic law;

(ii) Enhanced information on its steps taken to promote and/or implement any decisions taken by ICAO and IMO;

(iii) Information on the expected impacts of climate change in Monaco and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation;

(b) Improve the transparency of its reporting by including in its next NC the following:

[8] The recommendations are given in full in the relevant sections of this report.

(i) Further information on how its national circumstances affect GHG emissions and removals and how its national circumstances and changes therein affect GHG emissions and removals over time;

(ii) The reporting of PaMs organized by sector, subdivided by GHG;

(iii) The total effect of PaMs by gas, either in the section of its NC that is dedicated to reporting that information or by making an explicit reference to the relevant section of its NC where information thereon can be found.

Annex

Documents and information used during the review

A. Reference documents

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications". FCCC/CP/1999/7. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". FCCC/CP/1999/7. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention". Annex to decision 23/CP.19. Available at <http://unfccc.int/resource/docs/2013/cop19/eng/10a02.pdf#page=20>.

FCCC/SBI/2011/INF.1. Compilation and synthesis of fifth national communications. Executive summary. Note by the secretariat. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf01.pdf>.

FCCC/SBI/2011/INF.1/Add.1. Compilation and synthesis of fifth national communications. Note by the secretariat. Addendum. Policies, measures, and past and projected future greenhouse gas emission trends of Parties included in Annex I to the Convention. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf01a01.pdf>.

FCCC/SBI/2011/INF.1/Add.2. Compilation and synthesis of fifth national communications. Note by the secretariat. Addendum. Financial resources, technology transfer, vulnerability, adaptation and other issues relating to the implementation of the Convention by Parties included in Annex I to the Convention. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf01a02.pdf>.

FCCC/SBI/2011/INF.2. Compilation and synthesis of supplementary information incorporated in fifth national communications submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol. Note by the secretariat. Available at <http://unfccc.int/resource/docs/2011/sbi/eng/inf02.pdf>.

FCCC/ARR/2013/MCO. Report of the individual review of the annual submission of Monaco submitted in 2013. Available at <http://unfccc.int/resource/docs/2014/arr/mco.pdf>.

FCCC/IRR/2007/MCO. Report of the review of the initial report of Monaco. Available at <http://unfccc.int/resource/docs/2008/irr/mco.pdf>.

FCCC/IDR.5/MCO. Report of the in-depth review of the fifth national communication of Monaco. Available at <http://unfccc.int/resource/docs/2011/idr/mco05.pdf>.

Sixth national communication of Monaco. Available at <http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/mco_nc6_brI_french_revised.pdf>.

2013 greenhouse gas inventory submission of Monaco. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/7383.php>.

2014 greenhouse gas inventory submission of Monaco. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Patrick Roland (Ministry of Public Works, the Environment and Urban Development), including additional material on greenhouse gas projections, the national registry and recent climate policy developments in Monaco.